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ABSTRACT

The report examines uses, advantages, and criteria for selection of behavior rating scales (BRSs) and their use with juvenile offenders, focusing in particular on the Behavior Dimensions Rating Scale (BDRS). Previously normed using a representative sample of behavior disordered and nonhandicapped males and females in grades K-11 (N=1,942), the present study sought validation of the BDRS in correctional education settings using a standardized sample of 641 males residing in 9 regionally diverse state-operated juvenile correctional facilities. The instrument was completed by teachers, and the factor structure of responses from youth correctional facilities was compared with the factor structure of responses in the original BDRS validation using multi-group confirmatory factor analysis. Results indicated that the BDRS is factorially equivalent for subjects in regular educational settings and for juvenile offenders in correctional institutions. Noting that the delivery of appropriate educational services is dependent upon the assessment process, the instrument's potential use by correctional facilities to assess individual educational and behavioral needs, monitor behavioral change, and evaluate program and therapeutic effectiveness is described. References are appended. (JW)

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Behavior Dimensions Rating Scale for Use in
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A Research Report

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A Construct Validation Study on the Behavior Dimensions
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In 1983, an estimated 236,930 youths were temporarily detained in a secure facility prior to adjudication (National Center for Juvenile Justice (NCJJ), 1987). The American Correctional Association (1986) reports that in 1985 approximately 29,000 male juvenile offenders were being held in juvenile correctional facilities as a result of the court disposition of their cases. On the average, juveniles sentenced to youth correctional facilities are released to some type of community program within approximately six months, although the length of stay for any particular individual will vary according to offense committed, individual characteristics, and court jurisdiction (Arnold & Brungardt, 1983; Edgar, Webb, & Maddox, 1987).

The philosophy and organization of juvenile treatment programs vary greatly, however, most effective programs provide specific interventions aimed at remediating deficits in personal skills required to succeed in society (e.g., academic, interpersonal, and vocational) (Romig, 1978). Treatment interventions for juvenile offenders under the age of 18 almost certainly will include some type of training conducted in a classroom environment (Arnold & Brungardt, 1983).

The intent of this paper is to examine the various aspects of behavior rating scales (e.g., uses, advantages, and selection criteria). Specifically, the Behavior Dimensions Rating Scale (BDRS), which has recently been validated for use with juvenile offenders in correctional education facilities, will be reviewed.

Finally, the potential applications of the BDRS for use with juvenile offenders will be discussed.

Behavior Rating Scales

Professionals working with disturbed or disturbing individuals are frequently required to make intervention decisions based on the behaviors demonstrated by those individuals. Behavior rating scales (BRSs) are one method of identifying problem behaviors and quantifying decisions (Cairns & Green, 1979). The use of BRSs is widespread, particularly in schools and related settings (Skiba & O'Sullivan, 1987; Wilson, 1980).

What are BRSs?

BRSs are psychometric instruments which provide a structured guide with which a rater assesses specific aspects of an individual's behavior. These assessments are made based on the rater's direct observations, perceptions, and interactions with the individual being rated (Guilford, 1954). It requires the rater to evaluate a series of social interactions in light of cultural and contextual norms (Cairns & Green, 1979).

Uses of BRSs

Within educational settings, BRSs have been used primarily to assist in the preintervention assessment which includes the identification of specific behavioral characteristics of individual subjects (e.g., aggression, behavioral disturbance, and hyperactivity) (Algozzine, 1980; Bullock & Wilson, 1986; Burke, 1977; Cassel, 1962; Cullinan, Schloss, Epstein, 1987;

Epstein, Cullinan, & Rosemier, 1983; McCarney, Leigh, & Cornbleet, 1983; Millman & Pancost, 1977; Pimm & McClure, 1969; Quay & Peterson, 1983; Walker, 1983. The literature reports their use as aids in developing individual intervention plans and in the tracking of behavioral change (Bullock & Wilson, 1986; Wilson, 1980). Researchers and program evaluators have also made use of BRSs (Achenbach & Edelbrock, 1986; Bullock, Wilson, & Sarnacki, 1988; Eaker, Allen, Gray, & Heckel, 1983; Lukin, 1980; Quay & Love, 1977; Quay & Peterson, 1983; Richey, & Miller, 1987).

Advantages of BRSs

BRSs provide a systematic approach to behavioral assessment in which a standard set of relevant individual behaviors are considered. They facilitate data collection in that they require little time to complete (usually 5-10 minutes) and are inexpensive. In the case where direct observation of a subject by those responsible for assessment decisions (e.g., case managers or educational diagnosticians) is not feasible (e.g., different environments or times of the day), BRSs may be the most efficient and relevant format of behavioral data collection (Bullock & Wilson, 1986; Cairns & Green, 1979; Haynes & Wilson, 1979).

Selection of an Appropriate BRSs

Criticisms regarding BRSs are as widespread as their use (Saal, Downey, & Lahey, 1980). Concerns regarding the appropriateness of some BRSs may be justified. Wilson (1980)

noted in a review of the literature that "scales are often developed and employed in school settings with little or no evaluation of such factors as reliability, validity, sources of bias, or the utility of particular scales" (p. 58). Historically, BRSs have focused on elementary-aged children (Spivack & Swift, 1973). A selected review of six BRSs (Bullock & Wilson, 1988) revealed that norming samples in four of the six BRSs included approximately equal distributions of subjects across school-aged grade levels, the other two were normed using elementary school-aged subjects. Only two rating scales, the Behavior Dimensions Rating Scale (BDRS) (Bullock & Wilson, 1988) and the Behavior Evaluation Scale (BES) (McCarney, Leigh, & Cornbleet, 1983), were normed using a geographically representative national sample. Others were normed on data from clinical samples, urban centers, or geographically proximate school districts. Of the two nationally normed BRSs, only the BDRS norming population approximates an ethnically representative sample or includes a comparison group of identified emotionally disturbed/behaviorally disorders subjects.

There are several factors which should be considered when choosing a BRS. The characteristics of the population used during instrument validation should match the characteristics of the population to be assessed, otherwise extreme caution must be used when interpreting the results. Scales should maximize the the potential for sensitivity in responses (i.e., a 7-point scale is better than a 2-point scale). The more clearly the individual items are described, item specificity, the more likely responses

will accurately reflect the existence of that behavioral item (Wilson, 1980).

The Behavior Dimensions Rating Scale

The BDRS was developed and used in research to study the patterns of behaviors demonstrated by subjects with behavioral problems. Its characteristics have been influenced by numerous research studies (Bullock & Brown, 1970, 1972; Bullock & Zagar, 1980; Bullock, Wilson, & Sarnacki, 1988; Bullock, Zagar, Donahue, & Pelton, 1985; Guetzloe, 1975; Johnson, 1983; Sarnacki, 1987; Wilson, Moore, & Bullock, 1987). The BDRS consists of 43 pairs of bipolar descriptors. Each descriptor is defined in the manual to avoid misinterpretation. Raters choose one of seven positions, which best represent the subject's behavior, on a continuum between the bipolar descriptors. The 43 items comprise four subscales: (a) Aggressive/Acting Out, (b) Irresponsible/Inattentive, (c) Socially Withdrawn, and (d) Fearful/Anxious. Behavioral ratings with the BDRS are used in the development of a subject's behavioral profile which can serve as a guide for behavioral interventions (Bullock & Wilson, 1988).

As previously mentioned, the BDRS was normed using a geographically representative sample of subjects in grades K-11 (N = 1,942). The distribution of the sample is approximately equal across grade levels and includes both emotionally disturbed/behaviorally disordered and non-handicapped male and female subjects (Bullock & Wilson, 1988).

The Use of BRSs with Juvenile Offenders

A review of the psychological and educational literature from 1977 to the present revealed only seven documented occurrences of the use of BRSs with juvenile offenders. BRSs have been used to provide descriptive information, predict amenability to treatment interventions, measure treatment effects, and as a case management tool. Richey and Miller (1987) used a behavior rating scale to evaluate the academically related behaviors of male adolescents in a residential program. The Revised Behavior Problem Checklist (RBPC) (Quay & Peterson, 1983) has been used as an assessment tool in the initial classification of juvenile offenders. Gilliam and Scott (1987) used the RPBC to provide descriptive information about the characteristics of behaviorally disturbed juvenile offenders.

In research directed at improving assessment and prediction outcomes for juvenile offenders (Eaker et al., 1983) included the use of the Adolescent Behavioral Rating Scale (Allen & Heckel, 1981) among the evaluative materials. Lukin (1980) and Quay and Love (1977) have also used BRSs to measure the effect of treatment interventions with juvenile offenders.

Case management and program evaluation are administrative functions which can utilize BRSs. Adequate case management begins with an assessment of the juvenile offender's relevant behavioral characteristics and makes use of measures (BRSs) which monitor those behaviors (Stumphauzer, 1985). Evaluation techniques directed at assessing the impact of the program must provide data which measures change in targeted behaviors. Millman

and Pancost (1977) suggest the use of clinical measures, such as BRSs, over more rigorous quantitative measures when conducting program evaluation.

Purpose of this Study

The appropriate utilization of behavior rating scales requires an assumption that raters share a common pool of theoretical concepts regarding the behaviors in question, as well as, the same beliefs regarding the distribution of those behaviors within the population (Cairns & Green, 1979). Youth correctional facilities are organized to provide for the custody, treatment, educational, and vocational needs of assigned juveniles. The emphasis is on custody with the predominant concern being security (Arnold & Brungardt, 1983; Platt & Weinke, 1984). Additionally, correctional educators operate from a different professional basis (e.g., body of knowledge and literature) than educators found in public schools (Brown, 1985).

Youth placed in correctional facilities are not a representative sample of the youth found in regular educational settings. Not only have many experienced significant behavioral problems in regular educational settings, but they are also disproportionately male, minority, and of a lower socioeconomic class (Vinter, Newcomb, & Kish, 1976).

The purpose of this study was to determine if, given the above mentioned differences between regular and correctional education settings and professionals, the BDRS (Bullock & Wilson,

1988) was a valid instrument for use with juvenile offenders in correctional education facilities.

Sampling Procedures

As with the initial validation study for the BDRS, the standardization sample was drawn from each of the four geographic regions identified by the U.S. Census Bureau (1983) (i.e., Midwest, Northeast, South, and West). Facilities participating in the validation study were selected from the American Correctional Association (ACA) Directory (1986) on the basis of their (a) willingness to participate and (b) ability to identify subjects meeting the desired characteristics of the standardization sample. The facilities were, by region: Midwest: Youth Development Center, NE; Illinois Youth Center - Harrisburg, IL; Northeast: Skillman Training Center for Boys, NJ; South: Samarkand Manor, NC; Stonewall Jackson School, NC; Central Oklahoma Juvenile Treatment Center, OK; Hillsborough Correctional Institution, FL; West: Adobe Mountain Juvenile Institution, AZ; Lookout Mountain School, CO.

Subjects included in the correctional education standardization sample met specific criteria. They were (a) male, (b) not identified as handicapped as defined by The Education for All Handicapped Children Act of 1975 (P.L. 94-142) (20 USC 1401), (c) observed by their teacher for a minimum of 2 weeks, and (d) residing in a state operated juvenile correctional facility. Descriptive information regarding the age, ethnicity, and residence of the standardization sample is presented in Tables 1, 2, and 3.

Table 1

Distribution of the Standardized Sample by Age

Age Group	Percent of Standardized Sample N = 560a
11-12	b
13-14	6
15-16	30
17-18	47
19-20	5
21-22	b

a

Missing data on 81 subjects

b

Less than 1% of the sample size

Table 2

Distribution of the Standardized Sample by Ethnicity

Race/ Ethnic Origin	Percent of Standardized Sample N = 605a
Asian Pacific	0
Black	47
Caucasian	39
Native American	4
Hispanic	9
Other	1

a

Missing data on 36 subjects

Table 3

Statistics on Norming Group: Geographic Region

Region	Number of Students
Midwest	191
Northeast	82
South	266
West	102
Total	641

Directors of Education in state operated juvenile correctional facilities were queried regarding their ability to identify juvenile offenders meeting the above mentioned standardization criteria and the facility's willingness to participate in the validation study. A contact person in each participating facility distributed BDRS forms and instructions for completion to classroom teachers within that facility. Teachers completed the BDRS on randomly selected juvenile offenders meeting the standardization criteria. The completed forms were collected by the on-site contact person and mailed to the researchers.

Method of Analysis

The initial step in the further validation of the BDRS for use with adjudicated youth in correctional settings requires that the interpretation of responses from each group be similar (i.e., that the measurement properties of the variables be similar)

(Cairns, 1979). In order to determine the validity of the BDRS interpretation for use with juvenile offenders, the factor structure of BDRS responses from youth correctional facilities was compared with the factor structure of responses in the original BDRS validation using multi-group confirmatory factor analysis. The multi-group confirmatory factor analysis technique provides a better method of testing for a hypothesized factor structure than does exploratory factor analysis (Alwin & Jackson, 1981; Nunnally, 1978). Lisrel VI (Joreskog & Sorbom, 1981) is a computer program under SPSSX (1986) which, through the use of linear structural equations, can perform multi-group confirmatory factor analysis (Joreskog & Sorbom, 1986).

Lisrel VI Multi-Group Analysis

The structural model used in multi-group analysis has three parameters: (a) lambda, phi, and theta. Lambda is the variance/covariance matrix of the measured variables. The phi matrix is the variance/covariance matrix of the unmeasured variables (factors). Finally, the theta matrix is the variance/covariance matrix of the measurement errors associated with the measured variables. The model reads $\Sigma = \Lambda \Phi \Lambda' + \Theta \delta$, where Λ' is the inverse of lambda.

Lisrel VI uses a hierarchical approach to test the equality of group variance-covariance matrices. The successive hypotheses are designed to identify whether the variance-covariances are invariant, and, if they are not, in which parameter they differ.

Hypothesis A

The first hypothesis is that the group covariance matrices

are invariant. The test of this hypothesis requires the specification of a structural model for the first group in which all variance is accounted for in the latest variance-covariance matrix. This is accomplished by declaring (a) measurement errors to be zero and (b) each observation variable a factor which loads only on itself. The model for the second group is the same as the model for the first group except that the matrix is declared to be invariant to the matrix in the first group. Decisions regarding the rejection of hypotheses will be discussed following a description of all the steps in a multi-group analysis.

If the hypothesis that the variance-covariance matrices are invariant is not rejected then the groups need not be analyzed separately, as common group characteristics may be determined from the pooled covariance matrix (Joreskog & Sorbom, 1979). A rejected hypothesis leads to a series of tests designed to locate in which component of the confirmatory factor analytic model the variance-covariance matrices of the groups differ.

Hypothesis B

In order to identify where the two sets of data differ, the first step, Hypothesis B, is to eliminate the requirement that the parameters be invariant, yet requires the factor structure to be the same (i.e., the same number of factors). In order to compare the factor patterns of the two groups the number of factors must be determined. Once the size of the phi matrix is determined (i.e., the number of factors), it is then declared to be free, allowing the computer to estimate the values of each element. Next, the relationship between the individual variables

and the factors must be defined. In doing this, the lambda matrix of the first group is fixed. One variable for each factor is given a starting value in order to set a scale. The remaining variables comprising the factor are declared free. The lambda matrix for the second group is declared to have the same pattern as the first group. The theta matrices for each group is declared to be free and diagonal.

If Hypothesis B is not rejected, it can be assumed that although the factor patterns for each group are the same, the relationships among the variables within those factors are not equivalent. A rejection of the hypothesis leads to further analysis.

Hypothesis C

The third step, Hypothesis C, begins the process of identifying in which portion of the model the groups differ. In this step the model of the first group remains the same as in Hypothesis B. The lambda matrix for the second group is declared to be invariant to the lambda matrix of the first group.

When Hypothesis C is not rejected, one can assume that the both the lambda matrices have not only the same factor pattern, but are equivalent as well. Thus differences in the data must be attributable to either the phi or theta matrices. A rejection of the hypothesis ends the analysis, as the differences in the groups are found in the variables.

Hypothesis D

The fourth step, Hypothesis D, utilizing the previously identified model for group one, declares that both the lambda and

theta matrices of group two are invariant to those in group one. A rejection of this hypothesis locates the theta matrices as being different. Differences being attributable to unequal measurement errors. If, however, the hypothesis is not rejected then the two groups can be assumed to differ in the phi matrix.

Hypothesis E

The equality of the phi matrix can be verified, using the previously identified model for group one, by merely declaring that the lambda, theta, and phi matrices are invariant. Hypothesis E, if rejected, identifies the relationship among the factors for both groups as differing. A failure to reject the hypothesis would state that the two groups are roughly equivalent when the information contained in the variables are constrained to the number of factors in the phi matrix. It should be remembered that this model is not the same model as used in Hypothesis A, as it is a much more restrictive model.

Assessment of Fit

There are a number of techniques available to assess the fit of the data to the hypothesized model. To date, while no method appears to be a sufficient measure in and of itself, several methods are appropriate for comparing differing models and data, especially when reported together. These methods are (a) chi-square goodness of fit test, (b) goodness of fit index (GFI) (Joreskog & Sorbom, 1986), (c) adjusted goodness of fit index (AGFI) (Joreskog & Sorbom, 1986), (d) incremental fit index (IFI) (Tucker & Lewis, 1973), and (e) normed fit index (NFI) (Bentler & Bonnet, 1980). A brief discussion of each of these measures follows.

Upon the successful completion of a multi-group confirmatory factor analysis, LISREL VI provides (a) a print out of the chi-square value, the associated degrees of freedom and probability level; (b) the GFI, and (c) the root mean square residual (RMSR). The RMSR is not appropriate for comparisons across different data and will not be considered in this analysis (Joreskog & Sorbom, 1986).

Chi-Square Test

Decisions regarding the rejection of hypotheses may be based on a chi-square goodness of fit test. This is a measure of how well data of the two groups, in this case the BDRS norming sample and the correctional education data, fit together within the defined model. The degrees of freedom associated with the chi-square test is found by subtracting the number of independent parameters (t) from the result of one half the product of the number of observed variables (k) times itself plus one, $df = 1/2k(k+1)-t$. The accompanying probability level is the probability of obtaining a larger chi-square value, if the model is correct (Joreskog & Sorbom, 1979).

The appropriateness of using the probability level of the chi-square test to assess the goodness of fit between a given model and the data has been questioned for several reasons.

1. Models may be developed to provide a reasonable explanation of the data rather than to test a given hypothesis. If this is the case, the question becomes, how well does this model describe the data (Joreskog & Sorbom, 1986).

2. Frequently, there are violations of the assumptions under which the chi-square test is valid. It is assumed that (a) the observed variables have a normal distribution, (b) the analysis is based on a sample covariance matrix, and (c) the sample size is sufficiently large to justify the asymptotic properties of the chi-square test (Bentler & Bonett, 1980; Joreskog & Sorbom, 1986).

3. The chi-square test is easily influenced by sample size. When sample sizes are small, the use of the chi-square probability level has allowed for the possible "acceptance" of competing models (Bentler & Lee, 1979). Conversely, it is possible that with large sample size models which account for all the important statistical information will not have a probability level greater than .01 (McGaw & Joreskog, 1971).

Goodness of Fit Index

Another measure of model fit provided by LISREL VI is the GFI. Joreskog and Sorbom (1986) describe the GFI as a measure of how well the model accounts for the variance and covariance found in the data. It is independent of sample size and somewhat robust regarding deviations from normality. The statistical distribution of the GFI is not known, although it should be between zero and one. This lack of a standard for comparison makes the GFI an inadequate as a sole measure of model fit.

Adjusted Goodness of Fit Index

The AGFI is a measure which adjusts the GFI of various models for differing degrees of freedom. It is defined as $AGFI = 1 - [k(k+1)/2d](1-GFI)$, where k = the number of variables,

d = the degrees of freedom in the model, and GFI = the goodness of fit index for the model (Joreskog & Sorbom, 1986).

Incremental Fit Index

In order to assess the practical significance regarding the information gained by the use of a particular model, an incremental fit index (IFI) (Tucker & Lewis, 1973) can be used. This index is calculated by comparing the improvement in the fit a model provides over a null model of independence using the ratio of the chi-square variate to the degrees of freedom. The index calculates the improvement in fit a model provides over the most restrictive model possible, a null model of independence. The index is $p = (Q_0 - Q_k) / (Q_0 - 1)$, where Q_0 is the ratio of the chi-square value over the the degrees of freedom associated with the null model and Q_k is the ratio of the chi-square value and the degrees of freedom associated with the hypothesized model. Bentler and Bonett (1980) suggest that an IFI level of .90 is an indication of a relatively good fit between the data and the model estimates.

Normed Fit Index

When evaluating hierarchical models it is possible to obtain an index of the improvement in fit of each step as well as an overall index of fit by using the NFI. It is defined as $Pkt = (Q_k - Q_t) / (Q_0 - 1)$ with Q_t being the chi-square/degrees of freedom ratio. The NFI is additive in nature so that, $Pot = Pok + Pkt$.

Results

It was determined a priori that, regardless of the initial results, a complete multi-group confirmatory factor analysis,

Including Hypotheses A - E, would be conducted. The results of these tests and their accompanying indices are found in Table 4. As noted in Table 4, there were no chi-square probability levels above .01.

Table 4

Chi-Square, Degrees of Freedom, Goodness of Fit Index, and Incremental Fit Index by Hypothesis for Multi-Group Confirmatory Analysis of BDRS Norming Sample and Juvenile Offenders in Correctional Settings.

Hypothesis	Chi-Square	Degrees of Freedom	GFI	AGFI	IFI	NFI
Null	78596.3	1936	.143	.562		
A	2445.8	990	.876	.876	.962	.213
B	19492.2	1780	.695	.830	.75	-.0045
C	19620.7	1830	.686	.830	.75	-.0033
D	19850.7	1874	.682	.832	.75	.00076
E	20014.3	1884	.686	.835	.76	.76

The reporting of the results will be in two sections. First, the observations regarding the hypothesis that the variance/covariance matrices for the students in traditional educational settings, the BDRS norming sample, and those adjudicated juvenile offenders assigned to correctional facilities are invariant, Hypothesis A. Second, the results of Hypotheses B through E which provide information on the fit of the data when constrained to a four factor model, as presented in the BDRS manual.

Invariance of the Variance-Covariance Matrices

The comparison of the variance/covariance matrices of the BDRS norming sample and adjudicated juveniles serving in correctional facilities under Hypothesis A, that the matrices are invariant, resulted in a GFI and AGFI of .876. The practical utility of the model is demonstrated by an IFI of .962. The results of the NFI which provide an index of the step by step improvement in fit, will be discussed in the second part of the results section.

The improvement in the fit of the data to a model declaring the invariance of the variance/covariance matrices is shown by the increase of the GFI from .143 in the Null model to .876. When adjusted for differing degrees of freedom the improvement was from .562 to .876. An IFI of .962 is well above the .90 acceptance level suggested by Bentler and Bonnet (1980) and an indicator of a good fit between model and data. These results would not justify rejecting the hypothesis that the variance/covariance matrices of the two groups are invariant. Normally, further comparative analysis of the two groups would not be required as the common characteristics could be obtained from a combined variance/covariance matrix (Joreskog & Sorbom, 1986).

Four Factor Model

The results of Hypothesis B through E, which successively compares the two groups under the assumptions of (a) a number of common factors present in the measurement variables, (b) the invariance of the lambda matrices with the same number of common factors, (c) the invariance of the error variance/covariance

matrices (theta), and, finally, (d) that the lambda, theta, and phi matrices are simultaneously invariant. This last test, Hypothesis E, is essentially the same test as Hypothesis A, with two important exceptions, in this case the imposition of a four common factor model and the inclusion of measurement error.

It is evident in the results of tests conducted on Hypothesis B that the imposition of a four factor model on the data resulted in a noticeable loss in fit. Although, when adjusted for the differences in degrees of freedom the change in the AGFI from .876 to .830 was not as marked as the drop in GFI,

Also evident in the results of Hypotheses C through E is the support which would be expected for the findings of Hypothesis A. The imposition of equality restraints on the lambda, theta, and phi matrices in a four common factor model neither added to nor subtracted substantially from the fit of the data to the model. This is most noticeable in the very small changes in the NFI under Hypotheses B, C and D. This would appear to indicate that once the loss of fit as a result of the imposition of a four common factor model is accounted for the matrices are roughly equivalent.

Discussion and Implications for Practice

The identification of behaviorally disordered juvenile offenders in correctional facilities is fraught with definitional, procedural, and informational problems. Prevalence estimates vary greatly (Gilliam & Scott, 1987). Nonetheless, administrative and judicial pressures are necessitating that correctional facilities identify and serve behaviorally

disordered juvenile offenders assigned to correctional facilities (Warboys & Shauffer, 1986).

The finding that the BDRS is factorially equivalent for both groups, subjects in regular educational settings and juvenile offenders in correctional educational settings, is important. The findings are significant for professionals dealing with delinquent youth because (a) they provide a first step in establishing the validation of the use of the BDRS with juvenile offenders in correctional facilities and (b) with invariant variance-covariance matrices, the instrument may be used in either setting with the same interpretation.

The delivery of appropriate educational services is dependent upon the assessment process. The initial assessment of juvenile offenders entering correctional facilities is either accomplished by the receiving facility, if assigned to that facility by the Courts, or reception and diagnostic centers, established to determine appropriate facility placement during a temporary 2-4 week period (Arnold & Brungardt, 1983). Either facility is ill-prepared to adequately screen for the educational needs of incoming juvenile offenders for behavioral disorders or educational setting beyond assessing the current level of academic functioning (Gilliam & Scott, 1987). The availability of a BRS, validated using a standardized sample from correctional facilities, will enhance the ability of correctional educators to meet the requirements of P. L. 94-142 in serving the educational needs of behaviorally disordered juvenile offenders.

Additionally, behavioral information provided by classroom teachers offers educational decision-makers relevant information regarding the placement of non-handicapped juvenile offenders in correctional education classrooms and programs.

The BDRS can offer teachers, clinicians, and program evaluators a valid instrument to measure the effectiveness of classroom management techniques and therapeutic interventions, through the monitoring of individual juvenile offender behavioral adjustment and growth. In short, within correctional education facilities, the BDRS can be utilized with the same degree of confidence as within regular educational settings for any of the functions for which BRSs are typically employed.

The correlation between academic and behavioral difficulties in school and delinquent behavior is well established (Alexander, Cook, & McDill, 1978; Kelly & Balch, 1971; Schafer & Polk, 1976). There is evidence to suggest that when juvenile offenders return and successfully complete high school, they are less likely to be involved in criminal activity as adults (Needham & Grims, 1983). The reintegration of a juvenile offender into the community is critically important (Arnold, 1970; Burchard & Lane, 1982). Unfortunately, the components of a successful transition between juvenile correctional facilities and public school settings are abtruse and problematic (Edgar et al., 1987). Juvenile parole programs are generally not considered successful (Gibbons, 1981; Roming, 1978). The BDRS can assist professionals involved in interagency efforts to provide transition services to juvenile

offenders through improved data collection, case management, and program evaluation and research.

Eaker and others (1983), in a study of variables predicting institutional adjustment and amenability to treatment interventions, call for the inclusion of a wider range of juvenile behaviors in the assessment of juvenile offenders. School behavior is of particular importance. Stumphauzer (1985) underlines the importance of assessing behavior across behavioral settings. As mentioned previously, BRSs facilitate data collection. The BDRS which is valid for use in both regular educational and correctional education settings can provide a means to transfer relevant classroom behavioral information to educators in either setting.

Professionals charged with the supervision of juvenile offenders, and probation and parole officers are required to perform three functions: (a) surveillance, (b) counseling, and (c) provision of services. Large caseloads and the need for behavioral information from a wide variety of settings complicate efficient case management (Arnold & Brundgardt, 1983). The BDRS can assist case managers by providing a standardized quantifiable data collection instrument. This information can be used for initial assessment, monitoring of behavioral adjustment or progress, and case disposition decision-making.

increasingly, the use of recidivism or revocation rates have been found to be inadequate measures of program success or theoretical utility (Elliott, 1980; Kratcoski & Kratcoski, 1979).

The Institute of Judicial Administration-American Bar Association Joint Commission on Juvenile Justice Standards (1979) and Lukin (1980) call for the inclusion of additional measures of behavioral change when evaluating program effectiveness. The assessment of socially relevant behaviors at short intervals may serve to identify successful program components or conceptual links between behaviors and recidivism (Elliott, 1980).

Summary

Appropriately used, BRSs have considerable potential for use with juvenile offenders. Within correctional facilities they can be used to assess individual educational and behavioral needs, monitor behavioral change, and evaluate program and therapeutic effectiveness. Perhaps even greater potential exists as an aid for case management where standardized quantifiable data collection can assist in decision-making, program evaluation, and research. The BDRS is nationally validated with juvenile offenders assigned to correctional education facilities. Its subscales can be used for populations in regular educational and correctional education settings with the same interpretation.

References

- Achenbach, T. M. & Edelbrock, C. S. (1978). The classification of child psychopathology: A review and analysis of empirical efforts. Psychological bulletin, 85, 1275-1301.
- Achenbach, T. M. & Edelbrock, C. (1986). Manual for the teacher report form and teacher version of the child behavior profile. Burlington, VT: University of VT, Department of Psychiatry.
- Alexander, K. L., Cook, M., & McDill, E. L. (1978). Curriculum tracking and educational stratification: Some further evidence. American Sociological Review, XLI(1), 46-66.
- Algozzine, B. (1980). The disturbing child: A matter of opinion. Behavioral Disorders, 47, 223-233.
- Allen, S. S. & Heckel, R. V. (1981). Adolescent behavioral rating scale. Columbia, SC: University of South Carolina, Social Problems Research Institute.
- Alwin, D., & Jackson, D. (1981). Application of simultaneous factor analysis to issues of factorial invariance. In D. Jackson & E. Borgatta (Eds.), Factor analysis and measurement in sociological research: A multidimensional perspective (pp. 249-279). Beverly Hills, CA: Sage.
- American Correctional Association. (1986). Juvenile and adult correctional departments, institutions, agencies and paroling authorities. College Park, MD: Author.
- Arnold, W. R. (1970). Juveniles on parole: A sociological perspective. New York: Random House.
- Arnold, W. R. & Brungardt, T. M. (1983). Juvenile misconduct and delinquency. Boston: Houghton Mifflin.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88, 588-606.
- Bentler, P. M., & Lee, S. Y. (1979). A statistical development of three-mode factor analysis. British Journal of Mathematical and Statistical Psychology, 32, 87-104.
- Brown, S. (1985). Yesterday, today, and tomorrow: Correctional special education, five years later. Paper submitted to the Correctional/Special Education Training Project, Tempe, Az.
- Bullock, L. M. & Brown, R. K. (1970). Educational provisions for emotionally disturbed children. Gainesville, FL: Educational Research and Development Council.

- Bullock, L. M. & Brown, R. K. (1972). Behavioral dimensions of emotionally disturbed children. Exceptional Children, 38, 740-742.
- Bullock, L. M. & Wilson, M. J. (1986). Behavioral rating scales: Valuable assistance to educational personnel. The Pointer, 30(4), 21-24.
- Bullock, L. M. & Wilson, M. J. (1988). Manual for the behavior dimensions rating scale. Allen, TX: DLM.
- Bullock, L. M. & Wilson, M. J. (1988). Psychometric characteristics of behavior rating scales: Definitions, problems, and solutions. Manuscript submitted for publication.
- Bullock, L. M., Wilson, M. J., & Sarnacki, R. L. (1988). Behavior Dimensions Rating Scale: A comparison of elementary and secondary school aged student ratings. Manuscript submitted for publication.
- Bullock, L. M. & Zagar, E. L. (1980). Behavioral dimensions of behaviorally disordered and adjudicated children/youth assigned to special programs and the management techniques utilized by teachers of these children and youth. Denton, TX: North Texas State University.
- Bullock, L. M., Zagar, E. L., Donahue, C. A., & Pelton, G. B. (1985). Teacher's perceptions of behaviorally disordered students in a variety of settings. Exceptional Children, 52, 123-130.
- Burchard, J. D., & Lane, T. W. (1982). Crime and delinquency. In A. S. Bellak, M. Hersen, & A. E. Kazdin (Eds.). International handbook of behavior modification and therapy. New York: Plenum.
- Burke, H. F. (1977). Manual for the Burke's behavior rating scale. El Monte, CA: Arden Press.
- Cairns, R. B. & Green, J. A. (1979). How to assess personality and social patterns: Observations or ratings? In R.B. Cairns (Ed.), The analysis of social interactions: Methods, issues, and illustrations (pp. 209-226). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Carleson, C. L. & Lahey, B. B. (1979). Factor structure of teacher rating scales for children. School Psychology Review, 12, 285-292.
- Cassel, R. N. (1962). The child behavior rating scale manual. Los Angeles, CA: Western Psychological.

- Cullinan, D., Schloss, P. J., & Epstein, M. H. (1987). Relative prevalence and correlates of depressive characteristics among seriously emotionally disturbed and nonhandicapped students. Behavioral Disorders, 12(2), 90-98.
- Eaker, H. A., Allen, S. S., Gray, J., & Heckel, R. V. (1983). A factor analytic study of personality and intellectual variables in incarcerated delinquent males and females. Journal of Clinical Psychology, 39, 614-616.
- Edgar, E. B., Webb, S. L., & Maddox, M. (1987). Issues in transition: Transfer of youth from correctional facilities to public schools. In C. M. Nelson, R. B. Rutherford, Jr., & B. I. Wolford (Eds.), Special education in the criminal justice system (pp.251-274). Columbus, OH: Merrill.
- Elliott, D. S. (1980). Recurring issues in the evaluation of delinquency prevention and treatment programs. In D. Shichor and D. H. Kelly (Eds.), Critical issues in juvenile delinquency (pp. 237-262). Lexington, MA: Lexington Books.
- Epstein, M. H., Cullinan, D., & Rosemier, R. A. (1983). Behavior problems of behaviorally disordered and normal adolescents. Behavior Disorders, 8, 171-175.
- Gibbons, D. C. (1981). Delinquent behavior (3rd Ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Gilliam, J. E. & Scott, B. K. (1987). The behaviorally disordered offender. In C. M. Nelson, R. B. Rutherford, Jr., and B. I. Wolford (Eds.), Special education in the criminal justice system (pp. 141-162). Columbus, OH: Merrill.
- Guetzloe, E. (1975). Preferred learning patterns and behavioral dimensions of seriously emotionally disturbed and seriously learning disabled children: A comparison. Unpublished doctoral dissertation, University of Florida, Gainesville.
- Guilford, J. (1954). Psychometric methods (2nd ed.). New York: McGraw Hill.
- Haynes, S. N. & Wison, C. C. (1979). Behavioral assessment: Recent advances in methods, concepts, and applications. San Francisco: Jossey-Bass.
- Hoge, R. D. (1983). Psychometric properties of teacher-judgment measures of pupil attitudes, classroom behaviors, and achievement levels. Journal of Special Education, 17, 401-429.
- Institute of Judicial Administration-American Bar Association. (1979). Standards relating to corrections administration. Cambridge, MA: Ballinger.

- Johnson, D. (1983). A comparative study of severely disturbed and socially maladjusted adolescents. (Doctoral dissertation, University of South Florida, 1983). Dissertation Abstracts International, 44, 2734A. (University Microfilms, No. DA8329173)
- Joreskog, K. C., & Sorbom, D. (1979). Advances in factor analysis and structural equation models. Cambridge, MA: Abt Books.
- Joreskog, K. C., & Sorbom, D. (1981). LISREL user's guide: Analysis of linear structural relationship by the method of maximum likelihood. Chicago: International Educational Services.
- Joreskog, K. C., & Sorbom, D. (1986). LISREL VI user's guide: Analysis of linear structural relationships by maximum likelihood, instrumental variables, and least squares method. Mooresville, IN: Scientific Software.
- Kelly, D. H., & Balch, R. W. (1971). Social origins and school failure: A reexamination of Cohen's theory of working class delinquency. Pacific Sociological Review, X(4), 473-485.
- Kratcoski, P. C. & Kratcoski, L. D. (1979). Juvenile delinquency. Englewood Cliffs, NJ: Prentice-Hall.
- Lukin, P. R. (1980). Relationship of therapeutic change to recidivism of juvenile delinquents. Paper presented at the Annual Meeting of the Southeastern Psychological Association, Washington, DC. (ERIC Document Reproduction Service No. ED 192 224).
- McCarney, S. B., Leigh, J. E., & Cornbleet, J. A. (1983). Manual for the behavior evaluation scale. Columbia, MO: Educational Services.
- McGaw, B., & Joreskog, K. C. (1971). Factorial invariance of ability measures in groups differing in intelligence and socioeconomic status. British Journal of Mathematical and Statistical Psychology, 24, 154-168.
- Millman, H. L. & Pancost, R. O. (1977). Program evaluation in a residential treatment center. Behavioral Disorders, 2, 66-75.
- National Center for Juvenile Justice. (1987). Delinquency in the United States 1983. Washington, DC: Office of Juvenile Justice and Delinquency Prevention.
- Needham, M. J. & Grims, M. (1983). 1982-83 Youth in transition project (Chapter 1). Denver, CO: Colorado Department of Education and Colorado Division of Youth Services.
- Nunnally, J. C. (1978). Psychometric theory. New York: McGraw-Hill.

- Pimm, J. B., & McLure, G. (1969). Revised manual for the Ottawa school behavior checklist. Ottawa, Canada: Pimm Consultants.
- Platt, J., & Wienke, W. (1984). The development of an effective institutional level and individualized inservice program for correctional educators--a personalized selection and evaluation system. Journal of Correctional Education, 35, 8-12.
- Quay, H. C., & Love, C. T. (1977). The effects of a juvenile diversion program on rearrests. Criminal Justice and Behavior, 4, 377-396.
- Quay, H. C., & Peterson, D. R. (1983). Interim manual for the revised behavior problem checklist. Coral Gables, FL: University of Miami.
- Richey, D. D. & Miller, M. (1987). Academically-related behavior among delinquent boys: Their self-ratings and those of teachers. Journal of Correctional Education, 38, 26-28.
- Romig, D. A. (1978). Justice for our children. Lexington, MA: Lexington Books.
- Saal, F. E., Downey, R. G., & Lahey, M. A. (1980). Rating the ratings: Assessing the psychometric quality of rating data. Psychological Bulletin, 88, 413-428.
- Sarnacki, R. L. (1987). An examination of the behavioral dimensions of behaviorally disordered students across grade levels utilizing confirmatory factor analysis. Unpublished doctoral dissertation. Denton, TX: North Texas State University.
- Schafer, W. E., & Polk, K. (1976). Delinquency and the schools. In President's Commission on Law Enforcement and Administration of Justice, Task Force Report: Juvenile Delinquency and Youth Crime (Appendix M). Washington DC: U. S. Government Printing Office.
- Skiba, R. J. & O'Sullivan, P. J. (1987). Implications of the relationship between observational and rating scale data for the assessment of behavioral disorders. In S. Braaten, R. B. Rutherford, Jr., and J. Maag (Eds.), Programming for Adolescents with Behavioral Disorders: Vol. 3. (pp. 5-15). Reston, VA: Council for Children with Behavioral Disorders.
- Spivack, G. & Swift, M. (1973). The classroom behavior of children: A critical review of teacher-administered rating scales. Journal of Special Education, 7, 55-89.
- SPSS-X (1986). SPSS-X release 2.1. Chicago: SPSS.
- Stumphauzer, J. S. (1985). Evaluation: Assessing the behavior of delinquents. Child and Youth Services, 8, 31-65.

- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. Psychometrika, 38, 1-10.
- U. S. Department of Commerce, Bureau of Census (1983, December). 1980 Census of population, Volume 1, characteristics of the population, Chapter B, general population characteristics, Part 1, United States summary. (Publication number PC80-1-B1). Washington, DC: U. S. Government Printing Office.
- Vinter, R. D., Newcomb, T. M., & Kish, R. (1976). Time out: A national study of juvenile correctional programs. Ann Arbor, MI: National Assessment of Juvenile Corrections.
- Walker, H. M. (1983). Walker problem behavior identification checklist. Los Angeles, CA: Western Psychological Services.
- Warboys, L. M. & Shauffer, C. B. (1986). Legal issues in providing special education services to handicapped inmates. Remedial and Special Education, 7, 34-40.
- Wilson, C. C. (1980). Behavioral assessment: Questionnaires. School Psychology Review, 9, 58-66.
- Wilson, M. J., Moore, A. D., & Bullock, L. M. (1987). Factorial invariance of the Behavioral Dimensions Rating Scale. Measurement and Evaluation in Counseling and Development, 20, 11-17.